

# FQB7P20

## P-Channel QFET® MOSFET

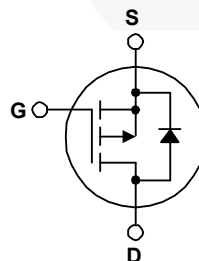
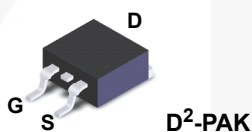
-200 V, -7.3 A, 690 mΩ

### Description

This P-Channel enhancement mode power MOSFET is produced using Fairchild Semiconductor's proprietary planar stripe and DMOS technology. This advanced MOSFET technology has been especially tailored to reduce on-state resistance, and to provide superior switching performance and high avalanche energy strength. These devices are suitable for switched mode power supplies, active power factor correction (PFC), and electronic lamp ballasts.

### Features

- -7.3 A, -200 V,  $R_{DS(on)} = 690 \text{ m}\Omega$  (Max.) @  $V_{GS} = -10 \text{ V}$ ,  $I_D = -3.65 \text{ A}$
- Low Gate Charge (Typ. 19 nC)
- Low Crss (Typ. 25 pF)
- 100% Avalanche Tested
- RoHS Compliant



### Absolute Maximum Ratings T<sub>C</sub> = 25°C unless otherwise noted.

Symbol	Parameter	FQB7P20TM	Unit
$V_{DSS}$	Drain-Source Voltage	-200	V
$I_D$	Drain Current - Continuous ( $T_C = 25^\circ\text{C}$ ) - Continuous ( $T_C = 100^\circ\text{C}$ )	-7.3	A
		-4.6	A
$I_{DM}$	Drain Current - Pulsed (Note 1)	-29.2	A
$V_{GSS}$	Gate-Source Voltage	$\pm 30$	V
$E_{AS}$	Single Pulsed Avalanche Energy (Note 2)	570	mJ
$I_{AR}$	Avalanche Current (Note 1)	-7.3	A
$E_{AR}$	Repetitive Avalanche Energy (Note 1)	9.0	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	-5.5	V/ns
$P_D$	Power Dissipation ( $T_A = 25^\circ\text{C}$ ) *	3.13	W
	Power Dissipation ( $T_C = 25^\circ\text{C}$ )	90	W
	- Derate above 25°C	0.72	W/°C
$T_J, T_{STG}$	Operating and Storage Temperature Range	-55 to +150	°C
$T_L$	Maximum Lead Temperature for Soldering, 1/8" from Case for 5 Seconds.	300	°C

### Thermal Characteristics

Symbol	Parameter	FQB7P20TM	Unit
$R_{\theta JC}$	Thermal Resistance, Junction to Case, Max.	0.7	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient (Minimum Pad of 2-oz Copper), Max.	62.5	
	Thermal Resistance, Junction to Ambient (*1 in <sup>2</sup> Pad of 2-oz Copper), Max.	40	



## Typical Characteristics

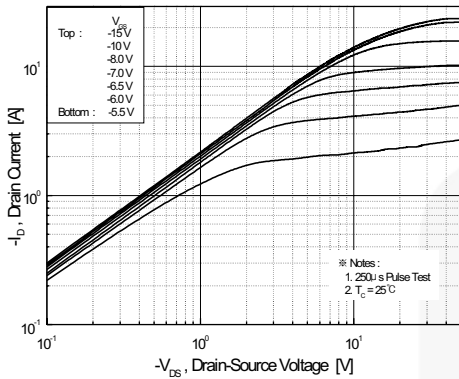


Figure 1. On-Region Characteristics

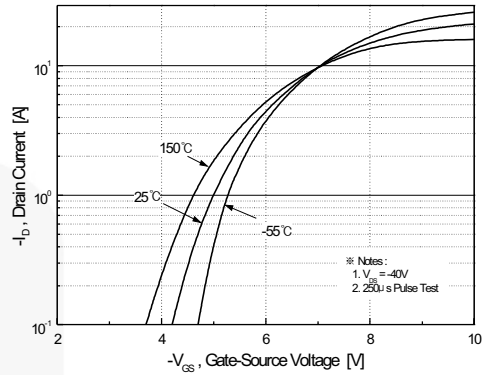


Figure 2. Transfer Characteristics

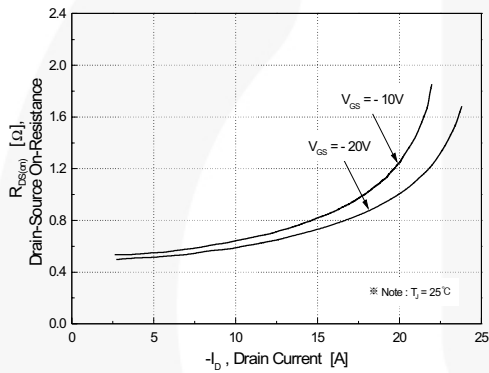


Figure 3. On-Resistance Variation vs. Drain Current and Gate Voltage

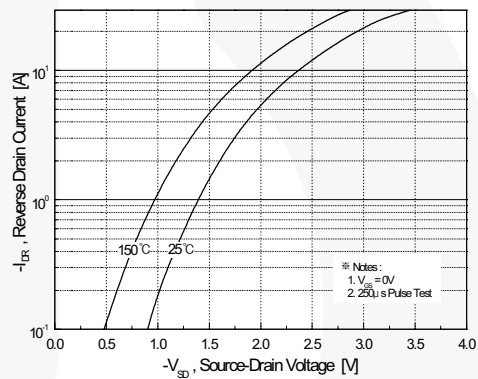


Figure 4. Body Diode Forward Voltage Variation vs. Source Current and Temperature

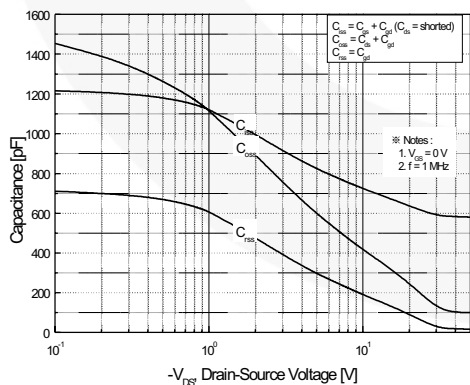


Figure 5. Capacitance Characteristics

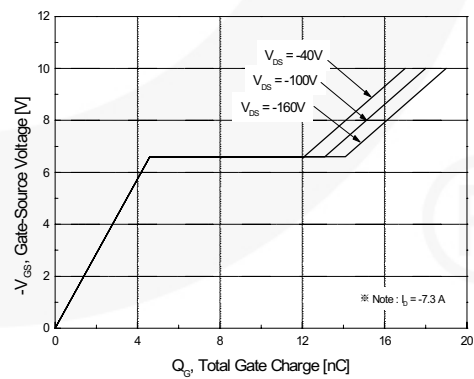
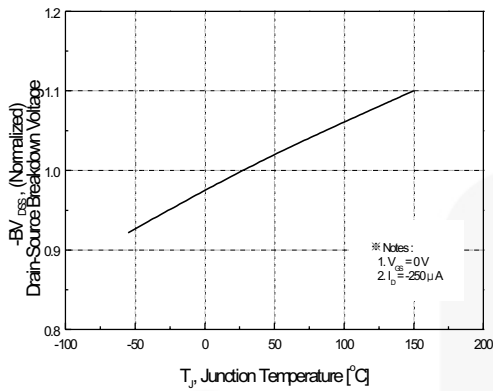
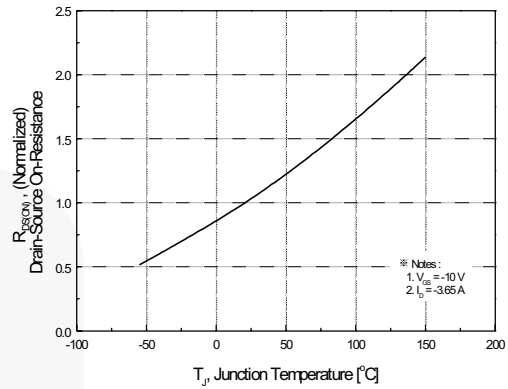


Figure 6. Gate Charge Characteristics

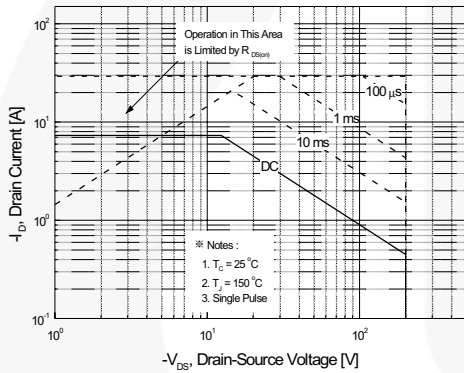
**Typical Characteristics** (Continued)



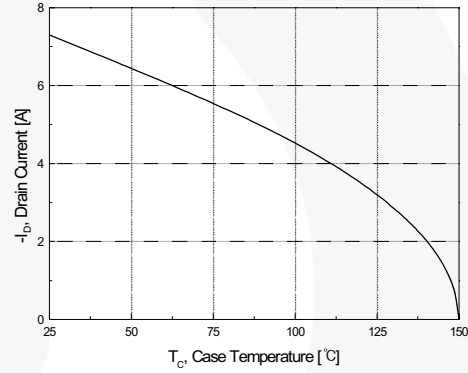
**Figure 7. Breakdown Voltage Variation vs. Temperature**



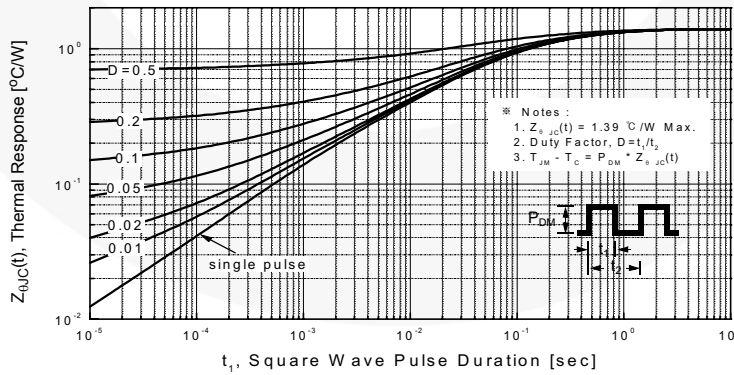
**Figure 8. On-Resistance Variation vs. Temperature**



**Figure 9. Maximum Safe Operating Area**



**Figure 10. Maximum Drain Current vs. Case Temperature**



**Figure 11. Transient Thermal Response Curve**

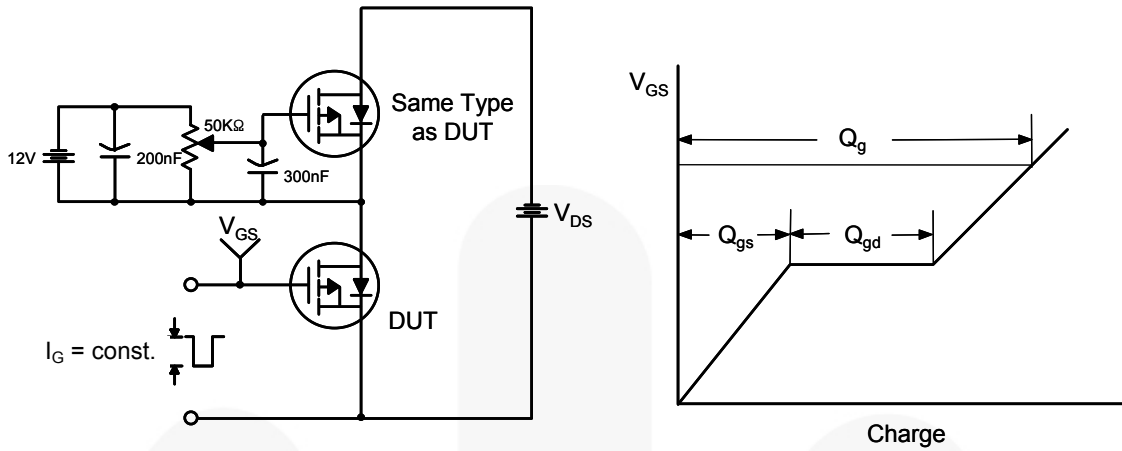


Figure 12. Gate Charge Test Circuit & Waveform

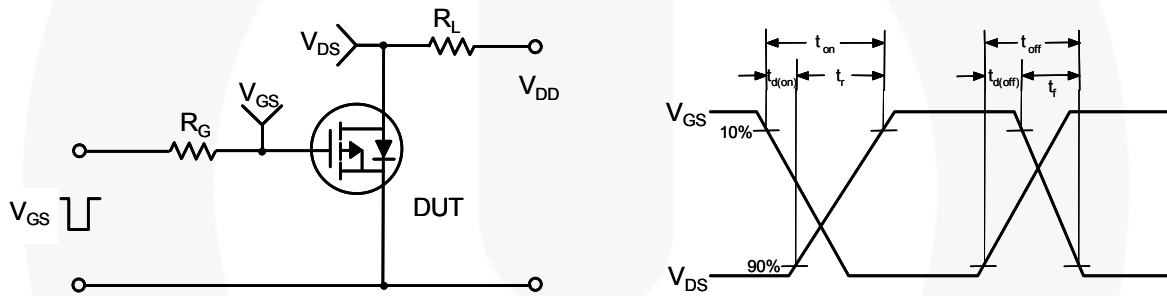


Figure 13. Resistive Switching Test Circuit & Waveforms

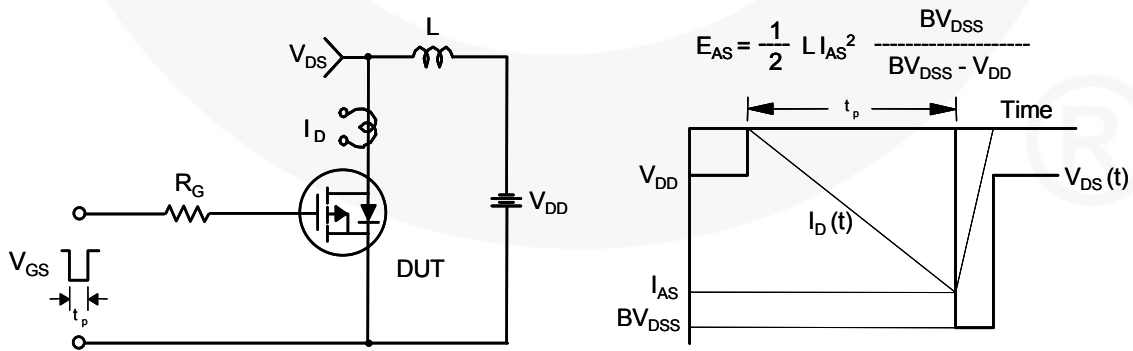


Figure 14. Unclamped Inductive Switching Test Circuit & Waveforms

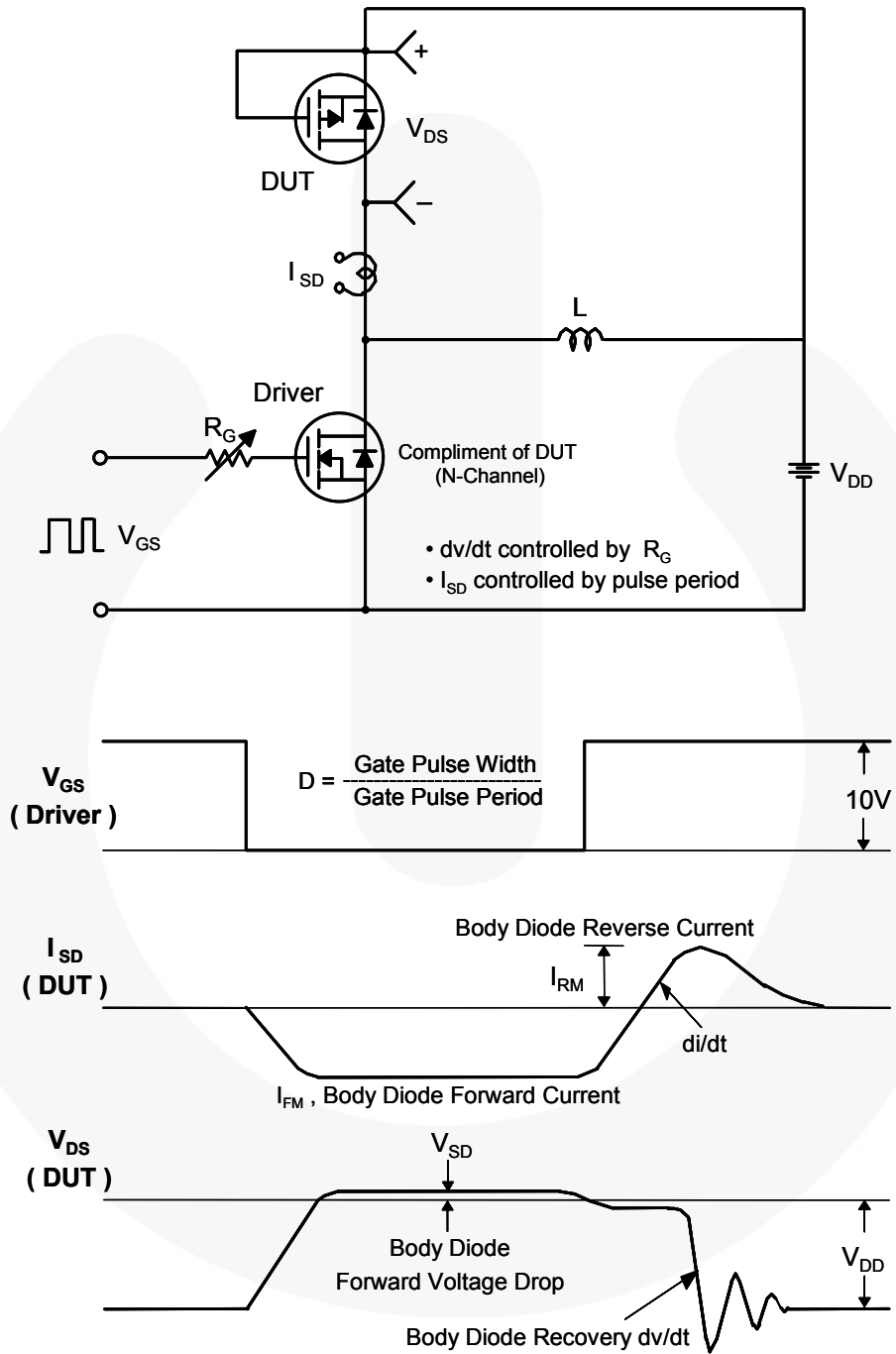
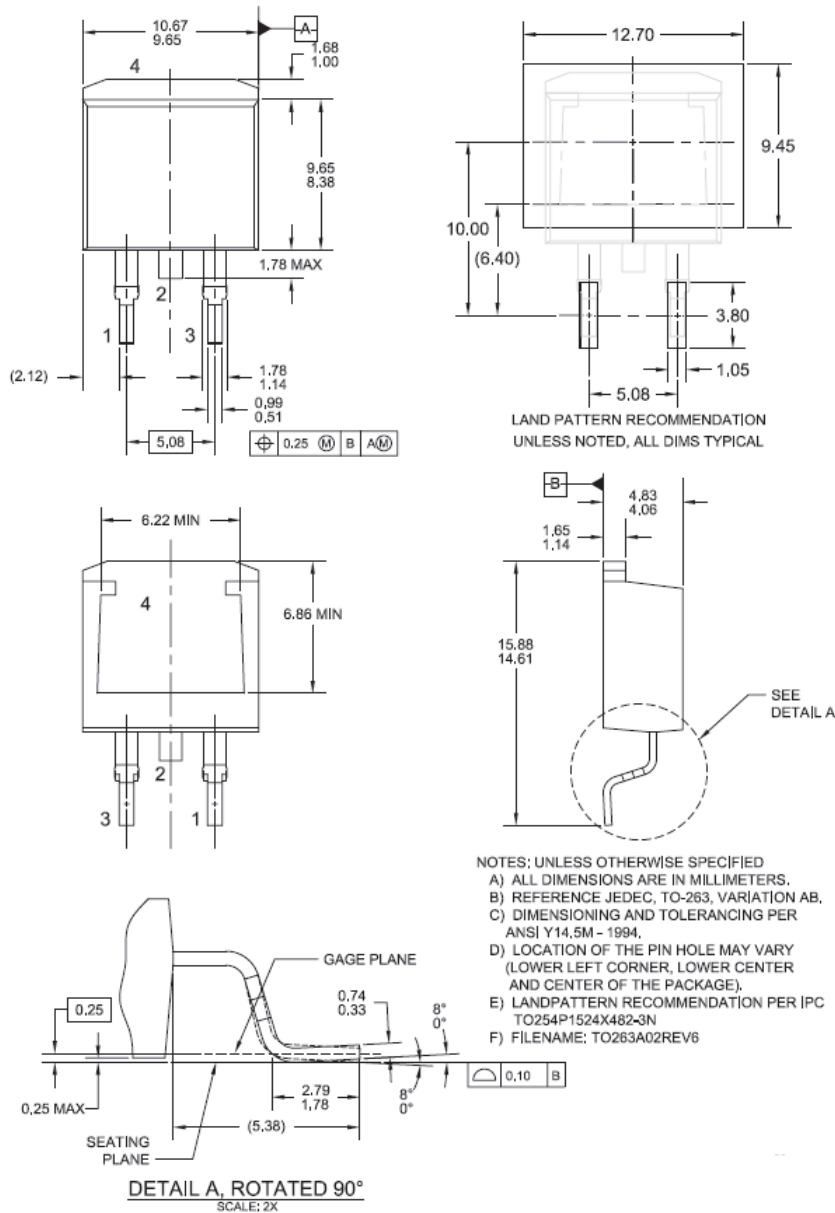


Figure 15. Peak Diode Recovery  $dv/dt$  Test Circuit & Waveforms

## Mechanical Dimensions



**Figure 16. TO263 (D<sup>2</sup>PAK), Molded, 2-Lead, Surface Mount**

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| Build it Now™            | GreenBridge™                                    | TinyBuck®                |
| CorePLUS™                | Green FPS™                                      | TinyCalc™                |
| CorePOWER™               | Green FPS™ e-Series™                            | TinyLogic®               |
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| CTL™                     | GTO™  | TinyPower™               |
| Current Transfer Logic™  | IntelliMAX™                                     | TinyPWM™                 |
| DEUXPEED®                | ISOPLANAR™                                      | TinyWire™                |
| Dual Cool™               | Marking Small Speakers Sound Louder and Better™ | TranSiC™                 |
| EcoSPARK®                | MegaBuck™                                       | TriFault Detect™         |
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| FastvCore™               | OPTOLOGIC®                                      | VoltagePlus™             |
| FETBench™                | OPTOPLANAR®                                     | XS™                      |
| FPS™                     |   |                          |
|                          | PowerTrench®                                    |                          |
|                          | PowerXS™  |                          |
|                          | Programmable Active Droop™                      |                          |
|                          | QFET®   |                          |
|                          | QS™   |                          |
|                          | Quiet Series™                                   |                          |
|                          | RapidConfigure™                                 |                          |
|                          | Saving our world, 1mW/W/kW at a time™           |                          |
|                          | SignalWise™                                     |                          |
|                          | SmartMax™                                       |                          |
|                          | SMART START™                                    |                          |
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|                          | SuperSOT™-3                                     |                          |
|                          | SuperSOT™-6                                     |                          |
|                          | SuperSOT™-8                                     |                          |
|                          | SupreMOS®                                       |                          |
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